Journal of
Pulmonology and
Intensive Care

Case Report

DOI: 10.51271/JOPIC-0054

A rare case of "inhalation fruit hypersensitivity"

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Cite this article: Gülşen EE, Kalpaklıoğlu AF, Bedir Keser G, Baççıoğlu A. A rare case of "inhalation fruit hypersensitivity". *J Pulmonol Intens Care.* 2025;3(2):38-39.

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Received: 06/02/2025 ◆ **Accepted**: 22/02/2025 ◆ **Published**: 29/05/2025

ABSTRACT

Allergies to vegetables and fruits develop as a primary sensitization to pollen allergens followed by cross-reactive secondary sensitization to foods or as a direct sensitization to foods via the gastrointestinal tract. Although much focus has been placed on food hypersensitivity reactions following oral ingestion, reactions resulting from skin contact and inhalation are slowly gaining attention. A 34-year-old female patient, who had no known history of chronic disease and was a teacher by profession, applied to our outpatient clinic with airway symptoms (dyspnea and cough) triggered by apple odor for 5 years. In our test room, where there are equipment that can intervene in a possible anaphylaxis, the patient was provoked with the smell of an apple. The patient was made to smell the apple cut in half for 10 seconds. The patient developed a dry cough that started as mild and then gradually became more severe, and mild urticarial lesions on the anterior chest wall. The patient was diagnosed with inhalation fruit hypersensitivity. An epinephrine auto-injectorwas prescribed and an IKS-LABA dry powder inhaler was prescribed for use when necessary. She was told to stay away from apples.

Keywords: Fruit, hypersensitivity, inhalation

INTRODUCTION

Food hypersensitivity reactions typically present as skin, gastrointestinal and respiratory symptoms such as urticaria, atopic dermatitis, nausea, vomiting, diarrhea, cough and asthma.[1] However, systemic anaphylactic reactions can also be observed in some cases. Fruits and vegetables account for a significant proportion of food hypersensitivity reactions. Sensitization to these foods may develop as a result of cross-reaction caused by allergy to the pollen of the relevant fruit or vegetable. Another route of sensitization is the direct ingestion of fruit or vegetables through the gastrointestinal tract.[2,3] These allergic reactions may develop after exposure to various components of the plant. For example, there are several published case reports describing allergic reactions to apple seeds without allergy to the pulp or peel of the fruit.[4-6] Reactions that develop only to the smell of the fruit can also be given as an example of this situation. Reactions that develop through skin contact and inhalation have recently attracted attention. Inhalational food hypersensitivity can cause significant morbidity in affected individuals. Exposure is usually more pronounced in occupational settings but can also occur during daily life. Clinical manifestations may range from a benign respiratory or skin reaction to a life-threatening systemic reaction.

CASE

A 34-year-old female patient, who has no known history of chronic disease and is a teacher, applied to our polyclinic with airway symptoms (dyspnea and cough) due to apple odor for 5 years. It was learned from the patient's anamnesis that this complaint developed after intense pepper spray exposure, that she had no such complaint until that period of her life, and that her complaints arose with apple odor or oral intake, whether she was aware of it or not. She stated that she had similar symptoms with oral intake compared to inhalation exposure, but their severity was greater.

The skin prick test performed with aeroallergens was found to be negative. The prick to prick test performed with apple, apple and pollen specific IgE and tryptase resulted in negative. The basal respiratory function test was within the normal range and reversibility was found to be negative. The patient was provoked with apple odor in our test room, which has equipment that can intervene in a possible anaphylaxis. The patient was made to smell the apple cut in half for 10 seconds. The patient developed a dry cough that started as mild and then became increasingly severe, and mild urticarial lesions on the anterior chest wall. During the physical examination, normal breath sounds were detected. While TA and SpO_2 values were measured as normal in vital signs, the pulse was between 120-140/min. During this time, a respiratory function test could not be performed due to severe cough. After the patient was given antihistamine and nebules (SABA+SAMA and IKS), the urticarial lesions regressed within 10 minutes, and the cough completely regressed within 30 minutes. The patient was diagnosed with food

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hypersensitivity developing through the respiratory tract. An epinephrine auto-injector was prescribed and an IKS-LABA dry powder inhaler was prescribed for use when necessary. She was told to stay away from apples.

DISCUSSION

Post-inhalation reactions to fruits have been linked to the PR protein family found in plants. These proteins are synthesized by plants in response to various biotic and abiotic stresses and accumulate in edible parts such as fruits, seeds and pollen grains. When ingested or inhaled, these proteins interact with IgE, which triggers an immunological response through antigen-antibody interaction, leading to the development of symptoms such as oral allergy syndrome, allergy, asthma, anaphylaxis, conjunctivitis, rhinitis, nausea.[7]

It was interesting to note that the prick and specific IgE test results against apple and pollen were negative, while the objective symptoms appeared with the apple inhalation test. Similarly, a 7-month-old boy who had anaphylaxis after being fed bananas despite a negative prick test with bananas is available in the literature.[8] The exposure of the patient to intense toxic gas in a part of his life may have caused damage to the mucosal defense mechanisms of the respiratory system. We think that this may have resulted in a reaction with a much lower dose of allergen even though it was not detected in the tests. It is also known that allergy may develop against lipid transfer protein (LTP) found in fruits grown especially in the Mediterranean region.[9] Although apple-specific IgE was negative in this case, it is also possible that an apple LTP-specific IgE-mediated allergic reaction developed.

Several published reports have highlighted cases of food hypersensitivity reactions following inhalation of airborne food allergens. In the literature, there are cases of allergic reactions to the odor of foods such as fish, eggs and cow's milk.[10-12] Sensitization may develop not only from childhood as in our case, but also after intense inhalation exposure to non-specific irritants at any period of life.[13]

CONCLUSION

Oral ingestion is the primary route of exposure to food allergens, which can cause or worsen allergic symptoms. However, an increasing number of published studies have highlighted allergic reactions to foods after inhalation. This case report provides an example of a food allergic reaction triggered by ingestion of the food as well as inhalation exposure to airborne food allergens. Patients with a history of allergic reaction after inhalation exposure to the relevant food should be considered. It should be kept in mind that environmental exposures to non-specific irritants (pepper spray), as in this case, may subsequently increase the reactivity of the respiratory tract. In addition to strict avoidance of the causative agent, such hypersensitive persons should carry an epinephrine auto-injector and identification indicating their allergic status. More publications are needed both to determine the accuracy and sensitivity of diagnostic tests and to determine the incidence of inhaled food allergy.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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